Tanta University
Faculty of Electronic Engineering
Dept. of electronics and Electrical Comm.
Time allowed : 3 hours

EEC3221 Acoustics and Ultrasonic
3rd Year
Date : 17/5/2015

Answer the following questions:

Question 1: **15 marks**

a. Explain the following phenomena for sound :
transmission through three media, reflection, refraction, diffraction, scattering and interference.

b. If two acoustic sources emit with levels of intensity of 80 and 90 dB. Find the combined sound intensity level?

Question 2: **15 marks**

a. What are the problems effect in the sound? How can you solve them?

b. what are the modes of speaker identification process ? and explain each mode.

Question 3: **20 marks**

a. Explain the discrete wavelet transform and derive the mathematical model?

b. what is the mechanism used in feature matching? And explain it?

Question 4: **15 marks**

a. Explain a speech encryption algorithm to achieve a high level of security in automatic speaker identification systems.

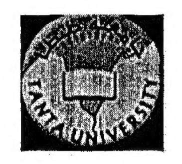
b. Derive the mathematical model for blind separation of speech signals.

Question 5: **20 marks**

a. What is meant by the directivity and directivity index of an acoustic source ? Give examples for a directivity and non directive sources and calculate the directivity and directivity index for these sources.

b. What are the types of microphone and explain the operation of each type.

Best wishes



Electronics and Electrical Communications Department



Missed Exam: 120 Marks

Tanta University **Faculty of Engineering**

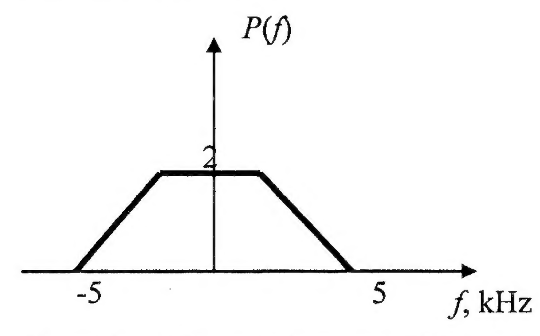
Course Title: Digital Comm. Systems	Course Code: EEC3220	Year: 3ed
Date: 18 / 5 / 2015	Allowed Time: 3 Hours	No. of Pages: (2)

Answer the following Questions

Question 1: [24 Degrees]

a. Explain mathematically with the aid of drawing the generation of PAM signal, indicating the basic concepts for doing so in order to be recoverable at the receiving end.

b. Assume you have the analogue signal shown below. Draw the frequency domain of the digital signal when the sampling rate is less than 10% as compared to the Nyquist rate. Then state your comments.



c. Show the difference between PPM and PWM signals as compared to PAM signal.

d. Explain two methods to demodulate PWM signals. Then comment on both.

Question 2: [24 Degrees]

a. What is the advantages of PCM digital transmission as compared to analogue transmission?

b. Draw and explain the general block diagram for the generation of PCM signal.

c. Explain and comment on the following:
   - Companding,
   - Mid-rise and mid-treed,
   - Granular noise.

d. Assume the multiplexing of 24 speech channels in a PAM system. The crosstalk in channel N+1 is reduced by a factor 1000 below the desired signal. If the channels N and N+1 have the same signal level, what must be the channel bandwidth, the lower and the upper frequency cutoffs of the channel? Assume that the sample width is two third the sampling time T_S.

Question 3: [24 Degrees]

a. Explain the Hartley's law and Shannon's limit considering the information capacity.

b. Indicate with the aid of drawing the difference between OOK, ASK, PSK, and FSK modulation formats.

c. Explain how minimum shift keying MSK is used to conserve FSK bandwidth.

d. The binary sequence "11001001" is applied to the QPSK transmitter
   - Deduce the truth table.
   - Draw signal constellation diagram.
   - Drive the values of transmitted signal.

Question 4: [24 Degrees]

a. Construct the truth table, phasor, and consultation diagram of 8 levels QAM digital radio transmission.
b. Explain the basic concepts of FDMA, TDMA, CDMA, space and polarization division multiple access schemes.
c. What do you know about ALOHA and slotted ALOHA schemes. On which multiple access schemes they are belongs to.
d. Why the contention of slotted ALOHA is reduced to the half as compared to pure ALOHA.

Question 5: [24 Degrees]

a. Considering Hamming code, determine the length of data bits n and the total code word m when the control bits k is selected to be 5.
b. Illustrate the length and the usefulness for all fields in the format of Carrier Sense Multiple Access with Contention Detection.
c. What is the meaning of the following words concerning CSMA/CD?
   - Defer,
   - Transmit,
   - Abort,
   - Retransmit, and
   - Back-off.
d. Concerning the Token Ring Networks define and explain the following:
   - Contention.
   - Token.

With best wishes

Course Examination Committee

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